Using Scenario Planning to Inform Land and Wildlife Management:
A pilot project for boreal forests in the Northeastern United States

Grant Agreement No.G14AC00434

Final Report: September 17, 2014-September 16, 2016
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SECTION 1. ADMINISTRATIVE INFORMATION

- Name and contact information of the award recipient: Molly Cross, Wildlife Conservation Society, 212 S. Wallace Ave, STE 101, Bozeman, MT 59715, 406-209-4060, mcross@wcs.org
- Agency or Institution of the recipient: Wildlife Conservation Society
- Project title: "Using Scenario Planning to Inform Land and Wildlife Management: A pilot project for boreal forests in the Northeastern United States"
- Agreement number: G14AC00434
- Date of the report: December 16, 2016
- Period of time covered by the report: September 17, 2014 through September 16, 2016
- Actual total cost of the project: The original budget (direct costs plus indirect) for Years 1 and 2 of this project was $207,167. As we indicated in the grant agreement modification for Year 3, we will be carrying forward approximately $10,000 from this amount into Year 3 (to go towards travel and meeting expenses). Please see the financial report associated with this grant agreement for details on actual spending and the final amount we will be carrying forward into Year 3. Some of the funding in Year 2 was used to start up work related to understanding the effects of climate change on boreal bird communities in the Adirondacks (the focus for Year 3 of this project).

SECTION 2. PUBLIC SUMMARY

Scenario planning is one decision support method that can help natural resource managers incorporate information about uncertain future changes in climate into management decisions. To provide a proof of concept of the value of scenario planning in helping managers prepare for climate change, we conducted a pilot scenario planning effort aimed at helping state agencies in the northeastern United States develop climate-informed moose management goals and actions.

To encourage participation by wildlife managers, we provided several opportunities for them to learn about scenario planning and examples of its application in natural resource management. We shared this information via guidance documents on incorporating climate change into State Wildlife Action Plans, organized sessions at professional conferences, on-line presentations, periodic project newsletters, and small group meetings with state wildlife managers. These educational efforts reached well over 50 managers across the northeast and other parts of the country, and were successful in building interest in scenario planning. In September 2016, we partnered with the New York Department of Environmental Conservation (NY-DEC) to lead a 1-day scenario planning exercise focused on setting goals and objectives for a state-wide moose management plan. WCS then worked closely with scientists at the Northeast Climate Science Center to develop a set of future climate scenarios that are directly relevant to examining how the draft moose populations goals and objectives developed during the first workshop might hold up under different scenarios of climate change. These scenarios will be used by NY-DEC in Spring 2017 when they take their next steps to prepare a moose management plan for the state.

Results from this pilot project are being incorporated into a manuscript that will describe several recent uses of scenario planning by natural resource managers, and how lessons learned can help refine future uses of scenario planning for climate-informed wildlife management.

SECTION 3. PROJECT SUMMARY

Scenario planning is one decision support method that can help managers incorporate information about future changes in climate and other drivers into their management decisions. Scenario planning focuses on issues that involve high levels of uncertainty—such as some aspects of climate change—and offers a framework for embracing those irreducible uncertainties in management. Scenario planning also provides an excellent opportunity to integrate information from a wide array of sources and disciplines, thereby capitalizing on the vast existing body of scientific research. To provide a proof of concept of how management plans and decisions can be informed by scenario planning, we conducted a pilot scenario planning effort aimed at helping state agencies in the northeastern United States develop climate-informed moose management goals and actions. We chose to focus on moose because of growing concerns about climate change effects on current and future moose population trends across multiple states in the northeast and beyond.

To encourage participation by wildlife managers, we provided several opportunities for them to learn about scenario planning and examples of its application in natural resource management. We shared this information via: 1) a section on scenario planning that was incorporated into a Northeast Climate Science Center (NE-CSC) guidance document on incorporating climate change into State Wildlife Action Plans; 2) organized sessions at annual professional conferences held by the Northeastern Association of Fish and Wildlife Agencies, the North American Moose Conference, National Adaptation Forum and the Society for Conservation Biology, 3) a presentation for the "Safeguarding Wildlife from Climate Change" webinar series hosted by US Fish and Wildlife Service and the National Wildlife Federation, 4) periodic project newsletters that were distributed to wildlife managers across the northeast, and 5) small group meetings with state wildlife managers. These educational efforts reached well over 50 wildlife and natural resource managers across the northeast and other parts of the country, and were successful in building interest in scenario planning.

After several meetings with scientists and managers at the New York Department of Environmental Conservation (NY-DEC), NY-DEC asked WCS to lead a 1-day scenario planning exercise focused on setting goals and objectives for a state-wide moose management plan. Feedback from participants in the scenario planning exercise indicated that they found the discussions and approach helpful in shaping their ideas for the plan. WCS then worked closely with scientists at the NE-CSC to develop a set of future climate scenarios that are directly relevant to examining how the draft moose management goals and objectives developed during the first workshop might hold up under different scenarios of climate change. These scenarios are centered on two main sources of uncertainty in future climate projections - the magnitude of change in temperature and the amount of inter-annual variability in precipitation and snow cover. The resulting four scenarios depict different combinations of higher vs. lower amounts of warming, and higher vs. lower variability in annual precipitation amount and spring snow cover. When NY-DEC takes their next steps in preparing a moose management plan in Spring 2017, we will work with them to look at how climate change might affect moose populations, in addition to affecting local human communities' perceptions about co-existing with moose on the landscape.

While the incorporation of climate change information into wildlife management plans in NY is an on-going process, we have already learned valuable lessons about the challenges and opportunities for helping managers use scenario planning as a tool for making climate-informed management decisions. The lessons and example of our work with NY-DEC and other wildlife managers in the northeast is being incorporated into a manuscript (Rowland et al. *in prep.*) targeted for a peer-reviewed scientific journal.

These lessons include the importance of: 1) having a champion from the implementing agency involved in the scenario planning effort, 2) increasing managers' understanding of and willingness to engage in what is likely to be an unfamiliar and new approach, 3) focusing on a management target that is of high interest or value to the agencies involved, and 4) integrating scenario planning concepts into existing planning processes. That paper will also describe several recent and on-going uses of scenario planning by natural resource managers, and provide recommendations for improving future uses of scenario planning for climate change adaptation and wildlife conservation.

SECTION 4. REPORT BODY

Purpose and Objectives:
The overall purpose of the funded project was to design and implement a pilot scenario planning effort that achieves the following objectives:

A. Provides information on climate change impacts and adaptation options that can be incorporated into State Wildlife Action Plans and/or other relevant management plans affecting boreal species and habitats in the Northeast; and
B. Provides proof of concept and a learning opportunity on how scenario planning can be used to bring existing research and analyses to bear on timely management decision-making and planning by state agencies.

After discussions with a group of climate scientists, natural resource managers and conservation practitioners, we chose to focus this scenario planning pilot project on moose management because of growing concerns about climate change effects on current and future moose population trends across multiple states in the northeast and beyond. During the past two years, the project has made significant progress towards achieving the above objectives by:

- Educating well over 50 natural resource managers about scenario planning as a tool for conservation planning under climate change-related uncertainties,
- Convening scientists and managers to discuss and synthesize relevant research on climate change effects on moose,
- Facilitating a pilot scenario planning exercise for NY-DEC designed to help the agency formulate a state-wide moose management plan,
- Developing a set of plausible future climate scenarios of relevance to moose management,
- Incorporating a section on scenario planning into the "Integrating Climate Change into Northeast and Midwest State Wildlife Action Plans" report produced by the Northeast Climate Science Center, and
- Sharing project results and lessons through three project newsletters, more than seven oral presentations, two reports and one peer-reviewed publication (in preparation).

The accomplishments listed above (and described in more detail in the *Project Results, Analysis and Findings* section and Table 1) represent notable progress towards using scenario planning as a tool for incorporating climate change into wildlife management decisions. There is still more work yet to be done to see the products of our science synthesis and climate scenario development and planning incorporated into actual management decisions. While we did not change any of the project's original Objectives, we did adjust our tactics (as described below in the *Organization and Approach* section) to accommodate the practical realities of working with state wildlife managers on climate change planning. We have already learned a lot from this pilot scenario planning effort (as described below in the *Conclusion and Recommendations* section), lessons we are sharing with both managers and climate change planners. Since the process of engaging state wildlife managers in climate change planning is on-going, we will no doubt continue to learn about both the challenges and opportunities for using scenario planning as a tool

to bring existing research and analyses to bear on timely management decision-making and planning (Objective B above).

In addition to working towards the original project objectives outlined above, in the second half of Year 2 we initiated new work related to understanding the effects of climate change on boreal bird communities in the Adirondacks, and the consequences of climate change on bird and habitat management decisions. This shift is driven by interest from the NY-DEC in exploring these questions, and our interest in applying the climate science and future scenarios developed for moose to the management of additional conservation targets in boreal and boreal-hardwood transitional forests. Our work will in Year 3 of this project (September 16, 2016 – September 31, 2017) will therefore be primarily focused on climate change effects on bird communities and habitat management, with more limited time spent with NY-DEC moose managers as they take next steps in the continued development of a state-wide moose management plan. Since the bird work is just getting underway, this report focuses primarily on the moose-related work we conducted in Years 1 and 2.

Organization and Approach:
The project used several approaches to achieve our Objectives related to providing information on climate change impacts and adaptation options that can be incorporated into management plans affecting boreal species and habitats in the Northeast. First, we convened experts on the effects of climate change on moose in the region to conduct a synthesis of available information. We then used scenario planning as a process for incorporating that scientific information into moose management planning. Scenario planning is a technique that is designed to account for irreducible uncertainties when planning for the future, and has been identified as a valuable tool for helping managers develop forward-looking and climate-informed management goals and actions. A series of project newsletters (attached) outlines the project activities and timeline as they unfolded.

While the original plan for the project was to spend most of our time conducting a scenario planning exercise with state wildlife managers, we found that it was difficult to interest managers in engaging in scenario planning. This is in part due to the fact that state wildlife managers are still in the early stages of figuring our whether and how climate change should factor into their decisions. As mentioned above, they are also largely unfamiliar with scenario planning. Because of the initial hesitation we encountered, we redirected our time, originally scheduled for scenario planning workshops, toward outreach and education efforts around scenario planning. Additionally, we developed relationships with the seemingly more interested states (e.g., New York, Maine and New Hampshire) to lay the groundwork for their interest in scenario planning. While these efforts to build relationships and increase the comfort level around scenario planning took more time, they succeeded in convincing the NY-DEC to conduct a scenario planning effort related to the development of a moose management plan (described in more detail below).

Project Results, Analysis and Findings:

Table 1 outlines the specific activities that were conducted and products that were developed as part of this project, and how they were designed to help achieve one or more of the project's overall Objectives outlined above.

Table 1. Activities and products supporting progress toward meeting overall project Objectives.

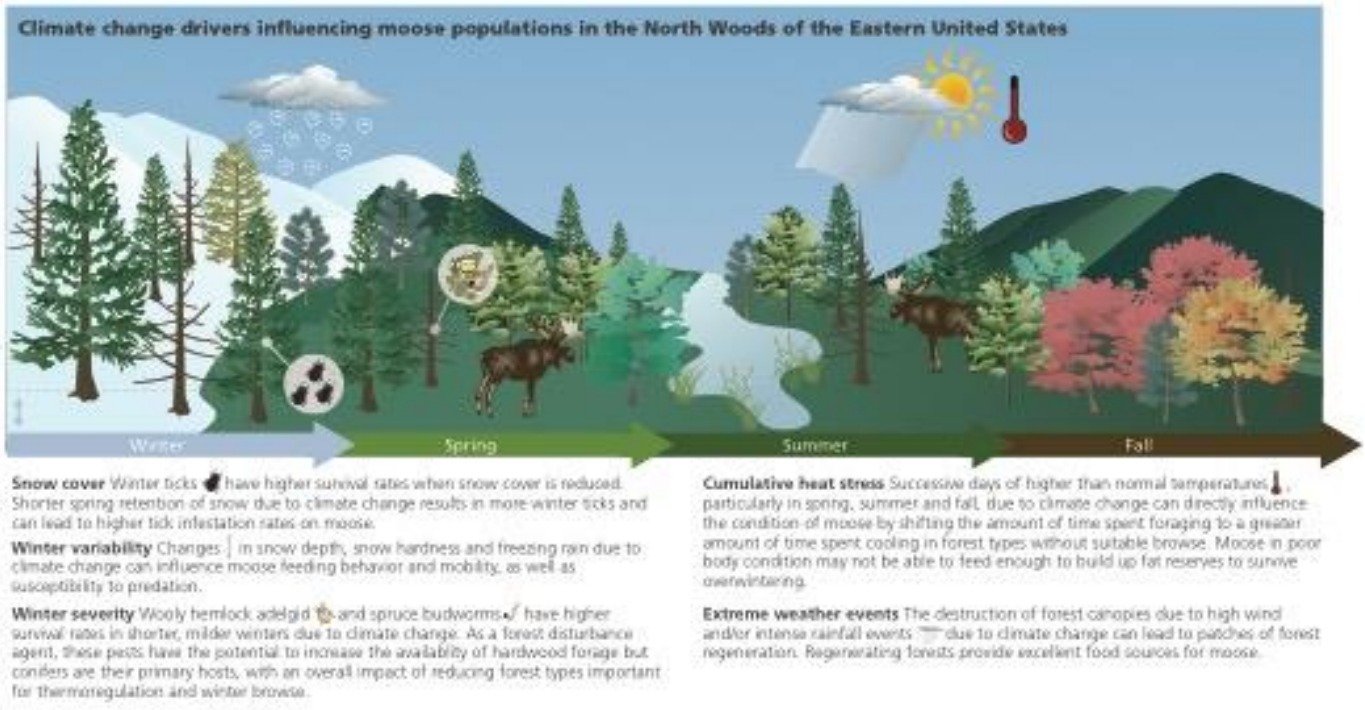
Activity/Product	Information synthesis (Obj. A)	Scenario development (Obj. A)	Application & adaptation options (Obj. A)	Shared learning & outreach (Obj. B)
Science Synthesis Workshop in Westborough, MA (February 2015)	X			

Preliminary climate scenario development for Northeast region (February 2015)		X		
Webinar sharing results from Science Synthesis Workshop (April 2015)	X			X
Organized symposium at Northeast Association of Fish and Wildlife Agencies 2015 annual conference, featuring presentations describing scenario planning efforts taking place in the Northeast (including this project) (April 2015)				X
Presentation/Q&A at meeting of NY-DEC moose managers and researchers in Ray Brook, NY (May 2015)				X
Contributed a section on scenario planning to the Northeast-CSC State Wildlife Action Plan climate science and impacts document (released June 2015)	X			X
Presentations on project at the North American Moose Conference (April 2015), the National Adaptation Forum (May 2015), the "Safeguarding Wildlife from Climate Change" webinar series (June 2015), the Organization of Wildlife Professionals webinar series (June 2016) and the Society for Conservation Biology conference (July 2016)				X
Meetings with biologists and managers with the Maine Department of Inland Fisheries and Wildlife biologists and New Hampshire Fish and Game Department working on revising state game management plans that include moose (January, February, July 2015)			X	X
Newsletters: Vol. 1-Project introduction (Dec 2014); Vol. 2-Summary of science synthesis workshop (Feb 2015); Vol. 3-Summary of scenario planning efforts in the Northeast (July 2015)				X
Project website with information synthesis and links to project newsletters and reports: https://sites.google.com/site/northeastspproject	X			X
Scenario Planning Workshop with NY-DEC staff in the Adirondacks to identify moose management objectives (Sept 9, 2015)		X	X	
Summary report from NY-DEC Scenario Planning Workshop (October 2015)			X	
Submitted a manuscript to the journal ALCES describing the moose scenario planning project (June 2016 – *based on review comments we have decided to fold the information from this manuscript into the paper described below*)				X
Worked with several scenario planning practitioners in natural resource management to outline a manuscript that describes experiences and challenges in moving from scenario planning to management actions (September 2016, manuscript *In Prep.*)				X

Working with Northeast-CSC staff, drafted a report that summarizes key climate impacts on moose, and outlines regional and Adirondack-specific climate change scenarios (September 2016, Final report still *In Prep.*)	X	X	X	

The first major outcome from our project was to convene climate change scientists and moose biologists working in the northeast to synthesize information on how climate change could influence moose populations and health. Observed and anticipated climate change effects are summarized in the 2nd project newsletter (attached, see also Figure 1), and include direct physiological effects on moose, and indirect effects on pests and parasites that negatively affect moose and changes in forest and wetland habitats that moose rely upon. At the workshop, participants also identified key areas of uncertainty in our understanding of climate change effects on moose, and discussed how those uncertainties could lead to multiple, plausible scenarios of the future (also described in the 2nd project newsletter, attached). Information synthesized during this first workshop and subsequent conversations with scientists and agency biologists built the foundation of resources used by WCS and staff at the NE-CSC to develop moose-relevant climate change scenarios for the northeast region, and the Adirondack mountains specifically (described in more detail below).

Figure 1. Summary of climate change effects on moose, from the 2nd project newsletter.



A second outcome of the project was to raise awareness among wildlife managers in the Northeast about scenario planning. As described in detail in Table 1 and the *Outreach and Products* section below, our scenario planning educational efforts included contributing to guidance on incorporating climate change into State Wildlife Action Plans, organizing sessions at professional conferences, presenting webinars, distributing periodic project newsletters, and meeting 1:1 and in small groups with state wildlife managers. Over the course of the project, these educational efforts reached well over 50 wildlife and natural resource managers across the northeast and other parts of the country.

A third outcome was to initiate a scenario planning exercise with NY-DEC focused on setting climate-informed moose population objectives for a state-wide moose management plan that the agency is developing. In an initial 1-day workshop, NY-DEC managers and scientists from WCS, USGS, Cornell University and the State University of NY (SUNY) gathered to: 1) Refine a set of future scenarios for the Adirondacks describing potential future conditions (e.g., land use/habitat availability, social perceptions, climate) for moose management; and 2) Identify alternative goals, objectives and strategies/actions for moose management in NY linked to each future scenario. This first workshop primarily focused on scenarios of current and future trends in moose population abundance and distribution (a major source of uncertainty), but participants also began to discuss how climate change might influence moose management objectives (see attached report "Scenario Planning Exercise: Considering Moose Management Objectives for New York" for a full summary of the meeting). This meeting laid important groundwork for showing NY-DEC managers how scenario planning can inform their management plan, and how climate change might play into further discussions. Feedback from participants in the scenario planning exercise indicated that they found the discussions and approach helpful in shaping their ideas for the plan.

Drawing upon the information from this initial workshop with NY-DEC managers and the climate science synthesis work conducted in Year 1, WCS worked closely with scientists at the NE-CSC to develop a set of future climate scenarios that are directly relevant to examining how the draft moose populations goals and objectives developed by NY-DEC might hold up under different scenarios of climate change. Those scenarios are described in a draft report "Climate scenarios to inform moose management in the Adirondack mountain region of northern New York" (attached). The scenarios are centered on two main sources of uncertainty in future climate projections of relevance to moose - the magnitude of change in temperature, and the amount of inter-annual variability in precipitation and snow cover over the next 2-3 decades. The resulting four scenarios depict different combinations of higher vs. lower amounts of warming (and associated decreases in the frequency of very cold days and increases in the number of very hot days), and higher vs. lower variability in annual precipitation amounts and spring snow cover. Each of these scenarios are likely to have significant, albeit different, influences on several key drivers of moose population abundance and health, including habitat conditions and interactions with pests and pathogens. When NY-DEC takes their next steps in preparing a moose management plan, we will work with them to look at how each of these climate change scenarios might alter moose populations, in addition to affecting local human communities' perceptions about co-existing with moose on the landscape.

While the incorporation of climate change information into wildlife management plans is an on-going process in NY, we have already learned valuable lessons about the challenges and opportunities for helping managers use scenario planning as a tool for making climate-informed management decisions (see *Conclusions and Recommendations* section below for more details). The lessons and example of our work with NY-DEC and other wildlife managers in the northeast is being incorporated into a manuscript (Rowland et al. *in prep.*) targeted for a peer-reviewed scientific journal. That paper will describe several recent and on-going uses of scenario planning by natural resource managers, and lessons from those efforts that can help refine future uses of scenario planning for climate change adaptation and wildlife conservation.

Outreach and Products:

As described above, we spent a lot of time organizing learning opportunities and developing outreach materials aimed at sharing information about scenario planning, the effects of climate change on moose in the northeast, and lessons learned throughout this pilot scenario planning project. Below is a list of the newsletters, reports and publications; workshops; conference and webinar presentations; and

communications with decision makers that we developed or conducted over the course of the past two years.

1. Newsletters, reports publications:
    - Newsletter Vol. 1: Introduction to project (Dec 2014).
    - Newsletter Vol. 2: Summary of Science Synthesis Workshop (Feb 2015).
    - Newsletter Vol. 3: Scenario planning efforts across the Northeast (July 2015).
    - Contributed section on scenario planning within the NE-CSC report "Integrating Climate Change into Northeast and Midwest State Wildlife Action Plans" (Staudinger et al. 2015).
    - Report: "Scenario Planning Exercise: Considering Moose Management Objectives for New York" – summarizes results from the scenario planning workshop with NY-DEC (October 2015).
    - Report: "Climate scenarios to inform moose management in the Adirondack Mountain region of northern New York" – summarizes key climate change effects on moose and outlines multiple plausible scenarios of climate change for use in moose management planning (Draft completed October 2016, Final version *In Prep.*).
    - Manuscript: "A pilot of scenario planning to support moose management in the face of climate change in the northeastern US" (Submitted to ALCES, now in revision for an alternate journal as part of a broader paper on lessons learned from real-world scenario planning exercises – described in next bullet).
    - Manuscript: "From strategic planning to conservation action: extending scenario methods in climate adaptation" (in preparation – this is the manuscript described in the bullet above, that will include lessons from the moose scenario planning project alongside other real-world scenario planning examples).
2. Workshops:
    - Science Synthesis Workshop, Westborough, MA February 4-5, 2015: Attendees (22) included university forest ecology, land use change and moose researchers; climate science researchers from the NE-CSC; MA state moose managers; and science communication group from the Integration and Application Network at the University of Maryland.
    - Scenario Planning Workshop with NY-DEC, September 9, 2015: Attendees (15) included NY-DEC staff and scientists from WCS, Cornell University, USGS and SUNY.
3. Conference & webinar presentations:
    - Northeast Association of Fish and Wildlife Agencies annual conference, Providence, RI, April 20, 2015: Erika Rowland organized a symposium (4 presentations) and a scenario planning activity. Session contributors included: Katie Theoharidies (Scenarios, Services, and Society/Research Coordination Network), Amanda Babson (National Park Service), James Herman (Adirondack Futures), and Erika Rowland (WCS).
    - Webinar linked to Science Synthesis workshop given on April 28, 2015 (Erika Rowland).
    - Presentation at the North American Moose Conference and Workshop, Middle Park, CO, April 29, 2015 (Laura Thompson).
    - Presentation at the National Adaptation Forum, St. Louis, MO on May 13, 2015 (Erika Rowland).
    - Presentation for the "Safeguarding Wildlife from Climate Change" webinar series, June 17, 2015. (Erika Rowland).
    - Presentation for the North-Central Climate Science Center Stakeholder Advisory Committee meeting, December 9, 2015 (Erika Rowland).
    - Presentation for a webinar series hosted by the Organization of Wildlife Professionals, June 1, 2016 (Erika Rowland).
    - Presentation at the US Fish and Wildlife Agency's Adaptation Practitioners Forum, June 9, 2016 (Erika Rowland).

- Presentation on Climate Informed Conservation Science and Action in One of the Last Wild Places in the Northeast, North American Congress for Conservation Biology, Madison WI, July 19, 2016 (Michale Glennon)

4. Communications with decision-makers
    - Managers at NY-DEC: 1) In-person meeting with NY-DEC staff on May 5, 2015 to introduce scenario planning and discuss possibility of using scenario planning to inform NY-DEC's moose management plan; 2) Multiple calls with Jeremy Hurst (Wildlife Biologist), Ed Reed (Regional Wildlife Manager) and Ben Tabor (Wildlife Biologist) on May 21, 2015 and July 14, 2015 to plan the 1-day scenario planning workshop with NY-DEC staff; 3) NY-DEC managers Jeremy Hurst, Ben Tabor, Chris Lassell, Ed Reed, Steve Heerkens, Shawn Reynolds, and Sharon Tabor attended an in-person scenario planning workshop held on September 9, 2015; 4) In-person meeting with NY-DEC regional biologists, managers, and technicians John Ozard, Tim Post, Ed Reed, Jed Hayden, Angelena Ross, Tim Watson, Rachel Bakerian on April 22, 2016 to discuss boreal bird work in the Adirondack Park. Michale Glennon (WCS) gave a presentation summarizing 10+ years of boreal bird work by WCS, and the group discussed results, lessons learned, and ideas for future research. They also discussed current NY-DEC priorities and management needs related to boreal birds, and opportunities for collaboration between WCS and NY-DEC. Results of this meeting helped to shape the focus and objectives for Year 3 of this project.
    - Managers at the Maine Department of Inland Fisheries and Wildlife: 1) calls with Lee Kantar (Moose Biologist, Jan 20, 2015), Wally Jakubus (Wildlife Biologist/Mammal Group Leader, Jan 21, 2015) to introduce scenario planning project and learn about Maine's moose program and current wildlife management planning; 2) In-person meeting with Nate Webb (Planner, July 9, 2015) to further discuss the application of scenario planning to upcoming revisions of Maine's wildlife management plans.
    - Managers at New Hampshire Fish and Game Department: Calls with Kris Rines (Moose Biologist, Feb 24, 2015) and Emily Preston (Wildlife Biologist/SWAP coordinator, Feb 26, 2015) to learn how New Hampshire is approaching their climate change planning, and gauge interest and opportunity for a scenario planning component of that planning.

Conclusions and Recommendations:

As described, we learned a lot about the challenges and opportunities of scenario planning as a tool for helping managers bring climate change information into their decisions. In order to make this project a success, we realized we needed to create opportunities to share information with wildlife managers about scenario planning and demonstrate its value to management planning and decision making. We also had to take time to find the right opportunity for influencing wildlife management planning and decision-making, since it was hard to find state agencies that were willing to explore the use of scenario planning. NY-DEC was willing to engage in a pilot scenario planning exercise, but they are still several steps away from assembling the relevant research and information they need to develop a moose management plan. NY-DEC has also had some staff turnover, which has affected this project and slowed their progress on developing a moose management plan. For these reasons, it will likely take more time before the results from the scenario planning workshop will be incorporated into a management plan for the state.

Despite these minor challenges, there is momentum for using scenario planning as a tool for incorporating climate information and we will continue to help NY-DEC managers develop a climate-informed management plan. This project has also allowed us to nurture relationships with the NY-DEC on other species of interest, for which there are climate change concerns and management consequences. Those discussions have opened up an opportunity to work closely with NY-DEC on understanding the fate of boreal bird communities in the face of changing climate and land use, and considering management options. Therefore, we have proposed to use much of the climate change information that was synthesized

over the past two years for the moose scenario planning project, including the future climate scenarios that we drafted in collaboration with scientists at the NE-CSC, and apply it to questions about bird management in the region.

Our experiences point to a few key considerations that we and others should heed when embarking on climate science synthesis and scenario planning. These recommendations will be described in greater detail in a forthcoming manuscript (Rowland et al. *In Prep.*) that will be targeted towards natural resource managers and the Landscape Conservation Cooperatives, many of which have expressed interested in scenario planning. In brief, we encourage scenario planning practitioners to:

- Take time to develop relationships and build trust with agency managers, both of which are necessary to doing science and synthesis that is designed to inform management decisions. For scenario planning to be embraced, it will likely take a champion from within the agency to help move it forward.
- Build managers' comfort level with scenario planning. Scenario planning is a new technique for many mangers and planners, therefore there is a need for targeted education about scenario planning, plus a greater number of models of how it is being used to make natural resource management decisions. This is particularly critical because, in many agencies, planning horizons are much shorter (3-5 years) than the perceived scope of climate change impacts and thinking that is needed for scenario planning, making the practical results of scenario planning for managers difficult to grasp.
- Focus on management issues that are particularly prominent on managers' decision making agendas. This will help engage managers because they will see the value of exercise to issues that are important to them. Taking the time to build relationships with managers at the start of the project will help identify what these most pressing concerns are; but also be prepared to be nimble and shift the focus as necessary, to make sure you continue to align with an agency's top interests.
- Focus on incorporating climate change into already-established planning processes and efforts, rather than conducting a stand-alone climate change scenario planning effort. This will increase the likelihood that managers will be willing to allocate time towards the effort, and help them see how it fits into their existing obligations.

The generous financial support from the USGS National Climate Change and Wildlife Science Center (NCCWSC) over the past two years has helped us make great strides in synthesizing and incorporating climate change information into moose management decisions in the northeast and New York State in particular. It has also helped to raise awareness about scenario planning as a tool to help support management decisions in the face of uncertain climate changes. There are a number of next steps that this project has set up, including continuing to help NY-DEC incorporate climate change into a state-wide moose management plan as that process moves forward. There are also opportunities to work with NY-DEC and other land, water and resource management agencies in the state on incorporating climate change into other planning and decision making opportunities. As described above, we are already using continued support from NCCWSC to work with NY-DEC on understanding the consequences of climate change for bird communities and management. We are also beginning to explore the consequences of climate change and human land use on the quality of ecosystem services provided by the Adirondack headwaters of the Hudson River to downstream users all the way to New York City. These and other projects will benefit from lessons and information generated by the pilot scenario planning project that was generously supported by NCCWSC over the past two years. We are very grateful for the support to-date, and look forward to continuing our collaboration.